

COMBINATION
HEATERS,

MANUFACTURED BY

M. MAHONY,
TROY, N. Y.

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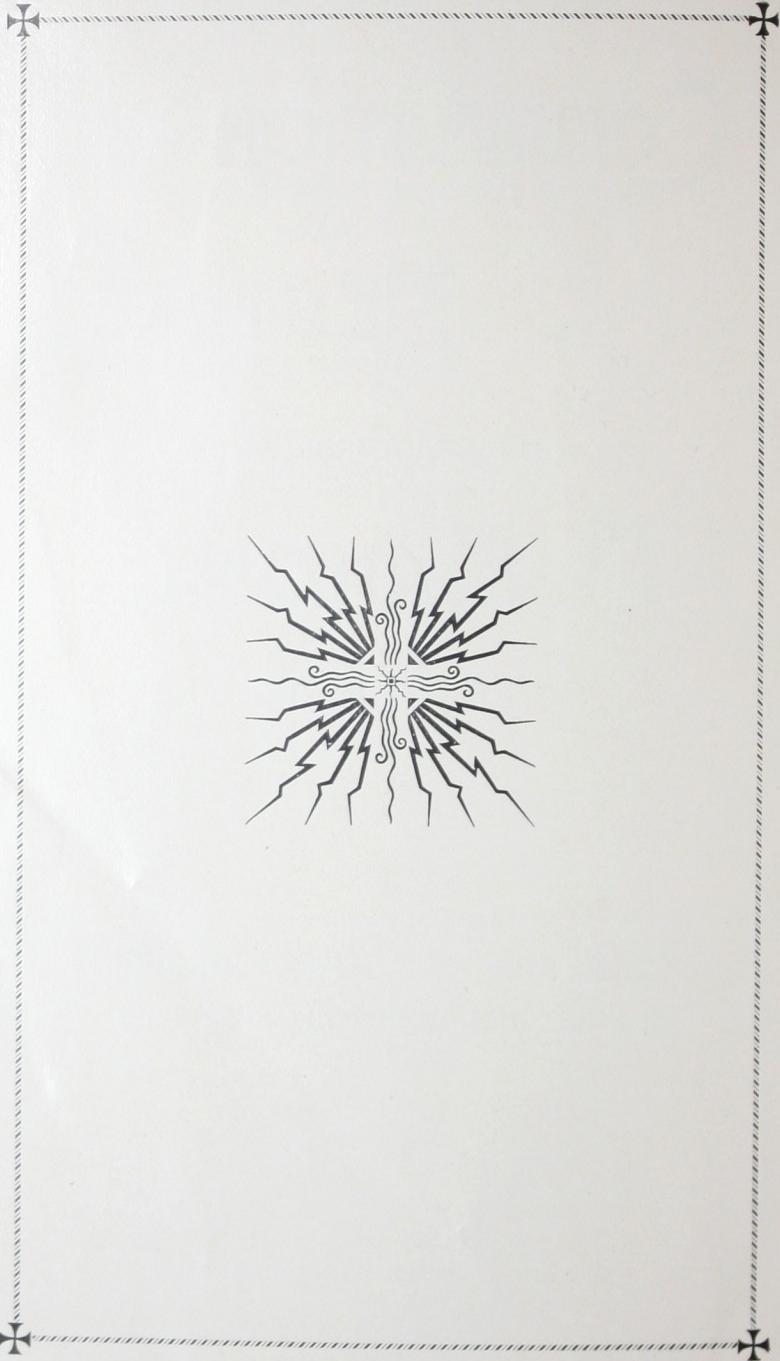
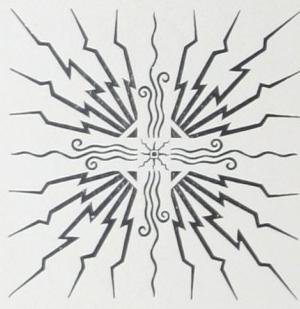
Early
MANUFACTURED BY

M. MAHONY,

TROY, N. Y.

ALSO MAN'F'R OF
STEAM AND HOT WATER BOILERS,
AND FULL LINE OF HOT AIR FURNACES.

TROY, N. Y.:
EDWARD GREEN & SON, PRINTERS,
1891.



THE COMBINATION SYSTEM.

THE system of warming buildings by combining steam and warm air or hot water and warm air heating is attracting much attention from the trade and those interested in improved methods and apparatus for heating purposes.

Every one admits the desirability of ventilation, and the better educated insist upon its necessity in residences, schools and churches, but the difficulty of securing a system of heating which provides for a supply of pure warmed air or a method of ventilating which does not interfere with the satisfactory warming of the building has not, so far, been overcome by any apparatus which has not been rejected as being too expensive or too complicated. Every system has both its merits and defects.

The Warm Air Furnace, properly employed, is, in many places, capable of securing excellent results both as to heating and ventilating; but as generally used it is found that the air is over-heated and too dry for satisfactory ventilation, while it is too easily affected by strong winds to do acceptable heating, some rooms being too warm while others receive no heat.

Both steam and hot water heating have the merit of distributing the heat in all parts of a building without being affected by winds, but as usually introduced, no provision is made for fresh air. If fresh air is supplied to the steam or hot water radiators for heating by "indirect radiation," the apparatus becomes so expensive that it is rejected by the great majority.

THE COMBINATION SYSTEM includes the good points of warm air and steam or hot-water heating, and does not

include their defects. It is especially adapted to heating residences, the usual practice being to warm the halls and several rooms on the first floor by warm air and the remainder of the building by direct radiation from steam or hot-water. By this method pure air is warmed and distributed through the whole building, while every room, however distant from the heater, can be reached and warmed by the steam or water.

Hot water is preferred by many to steam in heating residences, because of the simpler apparatus required, the more uniform temperature obtained, the easier control of the heat to suit the weather, and the fact that there can be no possibility of injury to the boiler or of an explosion from lack of water or from pressure. Hot water is rather better suited to the combination system too, than steam, because the temperature of both the air and water are regulated by the fire, while the strong fire required to make steam sometimes gives too much warm air in mild weather. Another advantage is that hot water heating uses less fuel than steam heating.

In steam heating these advantages are offset in the estimation of others by the fact that the temperature of the air in rooms can be raised much quicker than with hot water, (that is, when the temperature of the water is low,) and that steam system can be put in building at from 30 to 40 per cent. cheaper, first cost.

First class steam or hot water heating is always done wholly, or in part, by "indirect radiation," so that fresh air may be secured. While good results are obtained by this method, it is very expensive.

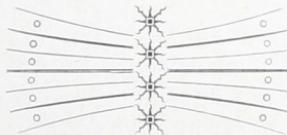
THE COMBINATION secures the same results as by indirect radiation without any complicated apparatus and at less cost.

THE WARM AIR FURNACE is excellent for heating purposes, if properly set up, in buildings where too long pipes are not needed to carry the warm air, but there are many cases in which rooms cannot be reached or properly warmed by warm air pipes which may be very readily heated by

the COMBINATION HEATER. Where there is difficulty found in heating certain rooms, because of winds or other reasons, the substitution of the Combination system will remedy the trouble without much expense, as the warm air pipes already in buildings can be used, and wherever there is a deficiency of heat it can be supplied from radiators warmed by hot water or steam.

In residences already constructed where it would be difficult to reach the rooms on the second and third floors with warm air, or in residences having conservatories attached, the COMBINATION will be found to be "just the thing."

The reception the COMBINATION HEATER is meeting with from the trade proves that in spite of the numerous furnaces and boilers on the market, there is a demand for something which will do more work for less money and with less fuel, and we are certain and back our opinion with the strongest guarantee that the MAHONY COMBINATION AIR AND STEAM OR WATER HEATERS will fill the bill.



REMARKS.

ALL flow and return pipes for hot water must be of equal size.

Air valves must be placed at highest point on all radiators and coils, it being as necessary to avoid air traps in hot water heating as water traps in steam heating.

There must be an expansion tank, holding about one-twentieth of the amount of water required for filling the system, placed above the highest radiator. This tank should be connected by a pipe to the lowest point in the system, and a size larger over-flow pipe, always open, must run from near top of tank to outside the building or other convenient place where the over-flow could do no harm if the water should boil.

A glass water-gauge with try-cocks should be placed on the tank to indicate the level of water.

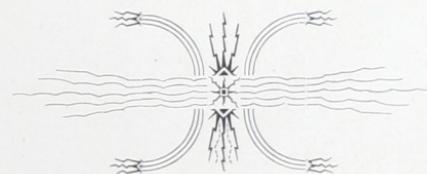
When the system has been filled with water there is practically a small loss by evaporation.

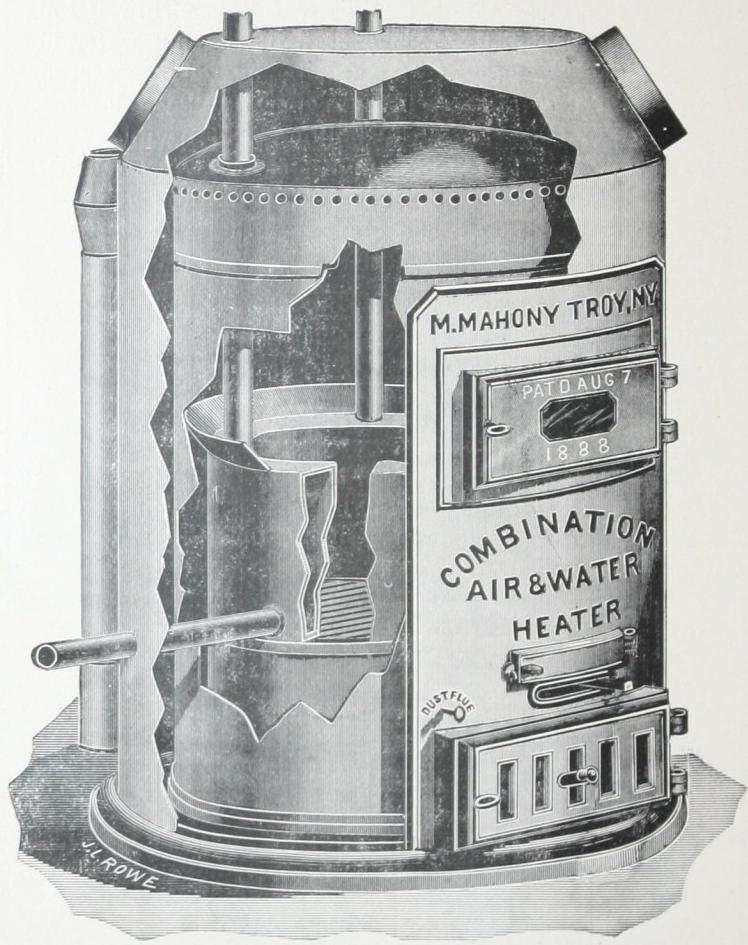
The secret of successful hot water or steam heating lies in having the radiating surface large enough. Exposed residences require a proportion of one square foot of radiating surface to from twenty-five to thirty-five cubic feet of space on first floor, and thirty to forty cubic feet on the upper floors for water, and one square foot of radiating surface to from fifty to sixty cubic feet of space on first floor and sixty to seventy on second floor for steam, to give temperature of seventy degrees Fahrenheit at twenty degrees below zero. The more surface used to heat a given space the less fuel will be required.

In planning the system care must be taken to keep the amount of heating to be done by the air and water or steam properly proportioned. There must be a proper balance kept between the two. For instance, the No. 4 Combination Heater is rated to heat about 12,000 cubic feet by hot water and 8,000 cubic feet by warm air. Now, if only 6,000 cubic feet were to be heated by the hot water not more than 4,000 cubic feet could be heated by warm air, for the fire required to heat more air would keep the small amount of water constantly boiling. No trouble would occur, however, if the full amount of work were done with hot water, even though but one warm air pipe were used. Care must also be taken to so arrange the work that some of the hot water heating will be in constant use.

NOTE THIS — It is claimed that the MAHONY COMBINATION HEATERS will warm more space, with a given amount of fuel, than any other furnace or boiler on the market, and the manufacturer is always ready to prove it. As to its simplicity, durability and ease of management, the closest examination is invited.

Parties desiring information in the construction of Steam or Water Heating Apparatus will be furnished with book of instruction on application.





MAHONY COMBINATION WARM AIR AND HOT WATER HEATER,

FOR DWELLINGS, SCHOOLS, CHURCHES, ETC.

PURE AIR AND DIRECT RADIANT HEAT OBTAINED BY ITS USE.

DIMENSIONS, HEATING POWER AND PRICE LIST.

SIZE.	Price Complete with Casing or for Brick.	Price with-out Casing.	Diameter of Fire Pot.	Diameter of Casing.	Height of Furnace.	Sq. ft Rad. Sur.	Cub. Ft. Space Heater will warm in Dwellings, Schools, etc.	HOT WATER.	WARM AIR.
						Boiler will heat			
No. 3...	\$100 00	\$ 90 00	16 inch	35 inch	60	200 sq. ft.	6-8,000	3-5,000	
No. 4...	130 00	118 00	18½ "	38 "	62	300 "	9-12,000	5-8,000	
No. 5...	170 00	158 00	21 "	42 "	63	450 "	12-18,000	8-10,000	
No. 6...	225 00	210 00	25 "	52 "	70	650 "	19-26,000	9-12,000	

Capacity in cubic feet for Churches and Large Halls same as Steam Combination.



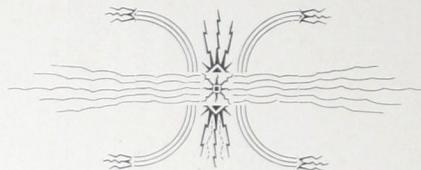
MAHONY COMBINATION

WARM AIR AND STEAM HEATER.

IT HAS GREAT HEATING POWER, ECONOMICAL OF FUEL, EASY TO OPERATE, IS SAFE AND DURABLE
AND THE COST IS MODERATE.

DIMENSIONS, HEATING POWER AND PRICE LIST.

SIZE.	Price Com- plete, with casing	Diameter of Fire Pot.	Diameter of Casing.	Height of Furnace.	Boiler will Heat, Direct Radi't'n	Sq. ft. Surface	CUBIC FEET OF SPACE BOILER WILL HEAT,		
							For Residences & Schools,	STEAM,	WARM AIR,
No. 3.	\$200 00	16 inch.	35 inch.	60 inch.	200	8 -10,000	2-3,000	20-30,000	10,000
No. 4	235 00	18½ "	38 "	62 "	300	12-15,000	3-5,000	30-45,000	15,000
No. 5.	270 00	21 "	42 "	63 "	450	18-20,000	5-7,000	45-65,000	20,000
No. 6.	340 00	25 "	52 "	70 "	650	25-28,000	6-9,000	65-95,000	30,000



THE MAHONY COMBINATION HEATERS are fully warranted as having the heating capacities given in tables of dimensions, etc., excluding surface in flow and return pipes. The figures given are for ordinary average conditions for good work. The piping must be so laid out as to secure good circulation of water or steam, and the warm air pipes and fresh air supply must be properly arranged and provided for before the manufacturer of the heater assumes any responsibility as to its working.

SIZE OF HOT AIR PIPES AND REGISTERS TO USE
IN DIFFERENT SIZED ROOMS.

FIRST FLOOR.		PIPES.
Rooms 10x12, 9 foot ceiling.....	8 inch.....	Register, 8x10
" 12x15, 9 "	9 "	" 9x12
" 14x14, 10 "	10 "	" 10x14
" 16x18, 11 "	13 "	" 14x16
SECOND FLOOR.		PIPES.
Rooms 10x10, 8 foot ceiling.....	7 inch.....	Register, 8x10
" 12x12, 8 "	8 "	" 8x12
" 15x15, 9 "	9 "	" 9x12
" 16x18, 10 "	10 "	" 10x14

The cold or fresh air duct should have three-quarters the capacity of all the warm air pipes from the Heater.

MINIMUM SIZES OF MAIN STEAM AND
RETURN PIPES.

Square feet of Direct Radiating Surface.	With Horizontal Returns Below Water Line.		With Overhead or "Dry" Horizontal Returns.	
	Steam Pipe.	Return Pipe.	Steam Pipe.	Return Pipe.
125.....	1 $\frac{1}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{4}$
125 to 200.....	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2	1 $\frac{1}{2}$
200 to 500.....	2	1 $\frac{1}{2}$	2 $\frac{1}{2}$	2
500 to 1000.....	2 $\frac{1}{2}$	2	3	2 $\frac{1}{2}$
1000 to 1500.....	3	2 $\frac{1}{2}$	3 $\frac{1}{2}$	3
1500 to 2500.....	3 $\frac{1}{2}$	3	4	3 $\frac{1}{2}$

MINIMUM SIZES OF MAIN FLOW AND RETURN PIPES FOR WATER.

Square Feet of Direct Radiating Surface.	Flow Pipe.	Return Pipe.
100.....	1 $\frac{1}{4}$ inch.	1 $\frac{1}{4}$ inch.
100 to 175.....	1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "
175 to 300.....	2 "	2 "
300 to 500.....	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "
500 to 800.....	3 "	3 "
800 to 1200.....	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "
1200 to 1600.....	4 "	4 "
1600 to 2000.....	4 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
2000 to 2500.....	5 "	5 "

MINIMUM SIZE OF RADIATOR CONNECTIONS AND VALVES FOR STEAM.

DIRECT RADIATION.

SQUARE FT. OF SURFACE.	Two-Pipe System.		One-Pipe System.
	STEAM.	RETURN	
0 to 30.....	$\frac{3}{4}$ inch.	$\frac{3}{4}$ inch.	1 inch.
30 to 100.....	1 "	$\frac{3}{4}$ "	$1\frac{1}{4}$ "
100 to 150.....	$1\frac{1}{4}$ "	1 "	$1\frac{1}{2}$ "
150 to 300.....	$1\frac{1}{2}$ "	$1\frac{1}{4}$ "	2 "

MINIMUM SIZE OF RADIATOR CONNECTIONS AND VALVES FOR WATER.

DIRECT RADIATION.

SQUARE FEET OF SURFACE.	FLOW.	RETURN.
0 to 60.....	1 inch.	1 inch.
60 to 100.....	$1\frac{1}{4}$ "	$1\frac{1}{4}$ "
100 to 200.....	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "

DIRECTIONS.

From information given in table of dimensions, etc., the size Heater required can be easily selected.

Make liberal estimate in determining the amount of Radiating Surface required and locate it in the coldest part of the rooms when possible.

Locate Heater in cellar as close to chimney as convenient piping will allow.

The Heater should be set as near the centre of system as possible to insure the best results.



Photo Eng. Co. N.Y.

GRACE M. E. CHURCH, TROY, N. Y.

Warmed by two No. 6 Mahony Combination Heaters—Air and Steam.

Apparatus put in by M. Mahony Troy, N. Y.



JOHNSTOWN (N. Y.) M. E. CHURCH,

Warmed by two No. 6 Mahony Combination Heaters—Water and Air.
Apparatus put in by M. Mahony, Troy, N. Y.





